

## ENGINEERING PRACTICE STUDY

TITLE: Proposed Changes to MIL-PRF-15305E

12 April 2004

PROJECT NUMBER 5950-1169 FINAL REPORT

Study Conducted By Gene Ebert  
Documentation Standardization Unit, DSCC-VAT

I. OBJECTIVES: Determine the feasibility of changes from the users standpoint and practical for manufacturers.

II. BACKGROUND: As a result of comments received from several sources (users and manufacturers) over a period of time, along with the necessity to update the specification content to the latest requirements, an EP Study (Proposed Changes to MIL-PRF-15305E) was distributed to all known users and manufacturers for comments (see attachment 1).

III. RESULTS: Following the distribution of the EP Study, several comments were received. These comments were summarized in a Compilation of Comments (see attachment 2) and sent out for additional comments. The only comments of concern received are included as attachments 3 and 4. Note that remark to comment 2 is addressed in the completion of EP Study to MIL-PRF-39010 (see attachment 5).

IV. CONCLUSIONS: Incorporate the recommended changes contained in the EP Study (see attachment 1) along with Compilation of Comments (see attachment 2) and the revision to the alternate coil mounting method in EP Study of MIL-PRF-39010E (see attachment 5).

### V. RECOMMENDATIONS:

a) Establish a project to revise MIL-PRF-15305 to take the following actions resulting from this EP study:

1) To preclude pure tin terminations, revise paragraph 3.5.2.1 to read : "Unless otherwise specified (see 3.1), the manufacturer shall verify that the leads conform to classification LW(---)C-32 or LW(---)C-52 of MIL-STD-1276 or an approved equivalent."

2) Include as an alternate test fixturing method for the Temperature Rise test (paragraph 4.8.9.1) straight leads soldered into "V" notched terminals (see attachment 5 Recommendation a)1) and attachment 6).

3) Correct the formula in parallel resistance (Rp) in paragraph 4.8.8.6 to read as follows:

$$\frac{159(Q1)(Q2)}{F(C1)(Q1 - Q2)} = R_p$$

Rp is in kilohms

F is in Megahertz

C1 is in Picofarads



**DEFENSE LOGISTICS AGENCY**  
 DEFENSE SUPPLY CENTER, COLUMBUS  
 POST OFFICE BOX 3990  
 COLUMBUS, OH 43216-5000

IN REPLY  
REFER TO

DSCC-VAT (Mr. Ebert / DSN 850-0729 [614] 692-0729 / eugene.ebert@dsccl.dla.mil)

MEMORANDUM FOR MILITARY AND INDUSTRY DISTRIBUTION

18 June 2003

SUBJECT: Engineering Practices (EP) Study: Proposed Changes to MIL-PRF-15305.  
 Project Number 5950-1169.

An engineering practices study is being performed to determine the feasibility of the following changes to the subject document:

- 1) To preclude PURE tin terminations, paragraph 3.5.2.1 will be revised to read: "Unless otherwise specified (see 3.1), the manufacturer shall verify that the leads conform to classification LW(---)C-52 of MIL-STD-1276 or an approved equivalent."
- 2) Reference paragraph 4.8.9.1 of MIL-PRF-15305 (Temperature Rise). The requirement that the wire leads have to be wrapped one turn around the test fixture terminals during temperature rise test is detrimental to the coil's lead integrity. These same coils are also subjected to terminal strength tests as part of Group B, Subgroup 3 inspection. Wrapping/soldering and unsoldering/unwrapping the leads to and from the terminals places extraordinary stress on the leads at the point of egress and can weaken them to the point where they are at risk of not meeting terminal strength requirements. To preclude this potential problem, recommend the straight leads be soldered into notched terminals for the temperature rise test.
- 3) Correct the formula for parallel resistance (Rp) in paragraph 4.8.8.6 of amendment 7 to read as follows:

$$\frac{159(Q1)(Q2)}{F(C1)(Q1 - Q2)} = R_p$$

Rp is in Ohms  
 F is in Meghoms  
 C1 is in Picofarads



Please review the recommended changes and provide concurrence or comments and/or suggested changes via e-mail to [eugene.ebert@dsccl.dla.mil](mailto:eugene.ebert@dsccl.dla.mil) or by FAX to (614) 692-6939.

Comments or suggested changes that are not editorial in nature should include justification. Industrial activities should indicate whether they are commenting from the standpoint of a "User" or "Manufacturer." Military review activities should forward comments to their custodians in sufficient time to allow for consolidating the departmental reply. All agencies, industry, and coordinated custodian comments should be sent to this center. Comments originating from the military departments must be identified as either "Essential" or "Suggested." Essential comments, which must be accepted or withdrawn, should be supported by test data unless they obviously require no data.

Please return comments to this Center no later than COB 11 August 2003. Any further coordination concerning this document will be circulated only to firms and organizations that furnish comments or reply that they have an interest.

Indicate below your interest and FAX or e-mail, to DSCC-VAT, DSN 850-6939 or commercial 614-692-6939, or e-mail comments to [eugene.ebert@dsccl.dla.mil](mailto:eugene.ebert@dsccl.dla.mil).

\_\_\_\_\_ CONCUR \_\_\_\_\_ NO INTEREST \_\_\_\_\_ WILL REPLY BY  
DEADLINE

COMPANY NAME \_\_\_\_\_ POINT OF CONTACT

PHONE \_\_\_\_\_ E-MAIL

If there are any questions, please contact Gene Ebert, phone DSN 850-0729/commercial 614-692-0729, FAX DSN 850-6939/commercial 614-692-6939, DSCC-VAT, P.O. Box 3990, Columbus, OH 43216-5000.

/S/

KENDALL A. COTTONGIM  
Chief  
Electronics Components Team

cc:

James Burke	DSCC-CPAA
Bob Evans	DSCC-VQP
Michael Jones	DSCC-VSC
William Heckman	DSCC-VSS
Dwight Oglesby	DSCC-VQP

## ATTACHMENT 2

PROJECT NUMBER 5950-1169	<b>COMPILATION OF COMMENTS</b>	COMMENT NUMBER 1
DOCUMENT MIL-PRF-15305 EP Study	COMMENTS IND NAME OR CODE: 99800 and 6U609	<input checked="" type="checkbox"/> MFR <input type="checkbox"/> USER <input type="checkbox"/> IND ASSOC
An issue we have is with specifying only “-52” as a final finish. We have designs qualified to MIL-PRF-15305E that have “-32” as the final finish.		
DoD USE ONLY	DEPARTMENT :	<input type="checkbox"/> A <input type="checkbox"/> N <input type="checkbox"/> AF <input type="checkbox"/> DLA <input type="checkbox"/> NSA <input type="checkbox"/> CNDN <input type="checkbox"/> NASA <input type="checkbox"/> ESSENTIAL <input checked="" type="checkbox"/> SUGGESTED
RECOMMENDED DISPOSITION OF COMMENT: <input type="checkbox"/> ACCEPTANCE <input type="checkbox"/> NON-ACCEPTANCE (see reason) <input type="checkbox"/> WITHDRAW <input type="checkbox"/> MODIFY <input checked="" type="checkbox"/> DISCUSS Revise paragraph 3.5.2.1 as stated in EP study to read “...LW(---)C-32 or LW(---)C-52...”		
FINAL DISPOSITION OF COMMENT: <input type="checkbox"/> ACCEPTANCE <input type="checkbox"/> NON-ACCEPTANCE <input type="checkbox"/> WITHDRAW <input type="checkbox"/> MODIFY		

PROJECT NUMBER 5950-1169	<b>COMPILATION OF COMMENTS</b>	COMMENT NUMBER 2
DOCUMENT MIL-PRF-15305 EP Study	COMMENTS IND NAME OR CODE: 99800 and 6U609	<input checked="" type="checkbox"/> MFR <input type="checkbox"/> USER <input type="checkbox"/> IND ASSOC
We suggest, “...terminal strength tests as part of Group B, Subgroup 3 inspection” be changed to “...the subsequent tests of table IV, Group II”.		
DoD USE ONLY	DEPARTMENT :	<input type="checkbox"/> A <input type="checkbox"/> N <input type="checkbox"/> AF <input type="checkbox"/> DLA <input type="checkbox"/> NSA <input type="checkbox"/> CNDN <input type="checkbox"/> NASA <input type="checkbox"/> ESSENTIAL <input checked="" type="checkbox"/> SUGGESTED
RECOMMENDED DISPOSITION OF COMMENT: <input type="checkbox"/> ACCEPTANCE <input checked="" type="checkbox"/> NON-ACCEPTANCE (see reason) <input type="checkbox"/> WITHDRAW <input type="checkbox"/> MODIFY <input type="checkbox"/> DISCUSS The use of an alternate method of attachment (in lieu of wrapping and soldering) using notched terminals and solder is being considered. This will be similar to changes presently being considered for MIL-PRF-39010.		
FINAL DISPOSITION OF COMMENT: <input type="checkbox"/> ACCEPTANCE <input type="checkbox"/> NON-ACCEPTANCE <input type="checkbox"/> WITHDRAW <input type="checkbox"/> MODIFY		

PROJECT NUMBER 5950-1169	<b>COMPILATION OF COMMENTS</b>	COMMENT NUMBER 3
DOCUMENT MIL-PRF-15305 EP Study	COMMENTS IND NAME OR CODE: 99800 and 6U609	<input checked="" type="checkbox"/> MFR <input type="checkbox"/> USER <input type="checkbox"/> IND ASSOC
Concerning changes to paragraph 4.8.8.6, there are two editorial comments: RP should be in kilohms F should be in Megahertz.		
DoD USE ONLY	DEPARTMENT :	<input type="checkbox"/> A <input type="checkbox"/> N <input type="checkbox"/> AF <input type="checkbox"/> DLA <input type="checkbox"/> NSA <input type="checkbox"/> CNDN <input type="checkbox"/> NASA <input type="checkbox"/> ESSENTIAL <input checked="" type="checkbox"/> SUGGESTED
RECOMMENDED DISPOSITION OF COMMENT: <input checked="" type="checkbox"/> ACCEPTANCE <input type="checkbox"/> NON-ACCEPTANCE (see reason) <input type="checkbox"/> WITHDRAW <input type="checkbox"/> MODIFY <input type="checkbox"/> DISCUSS		
FINAL DISPOSITION OF COMMENT: <input type="checkbox"/> ACCEPTANCE <input type="checkbox"/> NON-ACCEPTANCE <input type="checkbox"/> WITHDRAW <input type="checkbox"/> MODIFY		

### ATTACHMENT 3

COMMENTS FRO REVEIY, ON EP STUDY: PROPOSED CHANGES TO MIL-PRF-15305

Page 1 of 2

**Ebert, Eugene (Gene) A (DSCC)**

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**From:** Ebert, Eugene (Gene) A (DSCC)  
**Sent:** Thursday, February 05, 2004 8:54 AM  
**To:** 'Johnson, Fred L [AMSRD-AAR-AIC-S]'  
**Subject:** RE: COMMENTS FOR REVEIW, ON EP STUDY: PROPOSED CHANGES TO MIL-PRF-15305

Fred,

Thank you for bringing these errors to my attention.

The reference, "Group B, subgroup 3 inspection" is in error. The intended reference should have been to the Resistance to Soldering Heat in paragraph 4.8.11 per Amendment 7 to MIL-PRF-15305E which includes the Terminal Strength test.

Concerning the subject, it should read "COMMENTS FOR REVIEW,...".

Contact me with any questions.

*Gene Ebert*

Gene Ebert

DSCC-VAT

Voice: 614/692-0729, DSN 850-0729

FAX: 614/693-1646, DSN 869-1646

EMAIL: eugene.ebert@dla.mil

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-----Original Message-----

**From:** Johnson, Fred L [AMSRD-AAR-AIC-S] [mailto:fred.johnson@us.army.mil]  
**Sent:** Wednesday, February 04, 2004 12:20 PM  
**To:** Ebert, Eugene (Gene) A (DSCC)  
**Cc:** Johnson, Fred L [AMSRD-AAR-AIC-S]  
**Subject:** FW: COMMENTS FRO REVEIY, ON EP STUDY: PROPOSED CHANGES TO MIL-PRF-15305

Mr. Gene Ebert,

Could you clarify the following for comment # 2:

1. Reference the attachment (the 2nd page form) and the link to the DSCC web site (MIL-PRF-15305E EP Study).

Where is 'Group B, Subgroup 3 inspection' in MIL-PRF-15305?

2. In the subject above, what is 'FRO REVEIY'?

Thanks,  
Fred Johnson  
Standardization AR

-----Original Message-----

**From:** Powell, Rex M [AMSRD-AAR-AIC-S]  
**Sent:** Wednesday, January 21, 2004 4:36 PM  
**To:** Johnson, Fred L [AMSRD-AAR-AIC-S]  
**Subject:** FW: COMMENTS FRO REVEIY, ON EP STUDY: PROPOSED CHANGES TO MIL-PRF-15305

-----Original Message-----

2/5/2004

## ATTACHMENT 4

FW: MIL-PRF-39010 EP STUDY, ALTERNATE COIL MOUNTING METHOD

Page 1 of 3

**Ebert, Eugene (Gene) A (DSCC)**

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**From:** Carver, Jeffrey L CECOM LRC LEO [Jeffrey.Carver@us.army.mil]  
**Sent:** Tuesday, January 20, 2004 2:10 PM  
**To:** Ebert, Eugene (Gene) A (DSCC)  
**Subject:** RE: MIL-PRF-39010 EP STUDY, ALTERNATE COIL MOUNTING METHOD

US Army CECOM concurs with the proposed alternate coil mounting method.

Jeff Carver

-----Original Message-----

**From:** Ebert, Eugene (Gene) A (DSCC) [mailto:Eugene.Ebert@dla.mil]  
**Sent:** Friday, December 12, 2003 12:54 PM  
**To:** Jeffrey Carver (E-mail)  
**Subject:** FW: MIL-PRF-39010 EP STUDY, ALTERNATE COIL MOUNTING METHOD

Jeff,

In your reply to the EP Study on MIL-PRF-39010, you wanted to see specifics on how coils would be mounted if the present test method is changed.

Below is correspondence received from API Delevan concerning the utilization of a notched fixture (Keystone Electronics Corp. p/n 1268) for mounting and data they provided for comparison purposes.

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**From:** Joe Browne [jbrowne@delevan.com]  
**Sent:** Wednesday, December 10, 2003 1:17 PM  
**To:** Ebert, Eugene (Gene) A (DSCC)  
**Subject:** EP Study (MIL-PRF-39010)

Gene:

Per our conversation of 11/24/03, attached is the revised file (Temperature Rise Evaluation.xls) that incorporates the missing "(T-t)" into the formula for calculating temperature rise. My apologies for the delay in sending this file to you. If you have any additional questions or comments, please feel free to direct them to my attention. Thank you.

<<Temperature Rise Evaluation.xls>>

**From:** Joe Browne [jbrowne@delevan.com]  
**Sent:** Friday, November 21, 2003 5:28 PM  
**To:** Ebert, Eugene (Gene) A (DSCC)  
**Subject:** EP Study (MIL-PRF-39010)

Gene:

In regards to the use of the v-notch terminals for the temperature rise test, evaluation is complete on 36 sample pieces (12 pieces per core material). Reference the attached file (Temperature Rise Evaluation.xls) for recorded data. Reference my e-mail message of 8/20/03 for details on

1/20/2004

## ATTACHMENT 5

### ENGINEERING PRACTICE STUDY

TITLE: Proposed Changes to MIL-PRF-39010E basic and slash sheets 1 thru 10

24 February 2004

PROJECT NUMBER 5950-1163 FINAL REPORT

Study Conducted By Gene Ebert  
Documentation Standardization Unit, DSCC-VAT

I. OBJECTIVES: Determine what changes are desirable from the users standpoint and practical for manufacturers.

II. BACKGROUND: As a result of comments received from several sources (users and manufacturers) over a period of time, along with the necessity to update the specification content to the latest requirements, an EP Study (Proposed Changes to MIL-PRF-39010E basic and slash sheets 1 thru 10) was distributed to all known users and manufacturers for comments (see attachment 1).

III. RESULTS: Listed by EP study reference number.

- 1) API Delevan has rescinded the request, (see attachment 2, item number 1).
- 2) All replies concurred.
- 3) API Delevan proposed an alternate mounting method (see attachment 3). Data was reviewed and approved (see attachment 4).
- 4) NASA requested that MIL-STD-202 method 210 condition C be retained as it is the most stringent (see attachment 5 item number 4). Per a discussion with Vinod Patel at NASA, paragraph 4.8.10a is to be deleted from MIL-PRF-39010 to remove conflicts between procedures (depth of immersion vs. immerse board so it floats).
- 5) One negative comment received was resolved through a telephone call.
- 6) a) One negative comment received was resolved through a telephone call.  
b) One negative comment received was resolved through a telephone call.  
c) Both the Army and the Air Force expressed strong concerns that the time remain unchanged (see attachments 6 item number 1c and attachment 7 item number 6c).

The comments re summarized along with any actions taken as attachment 8.

IV. CONCLUSIONS: Incorporate the recommended changes contained in the EP Study (see attachment 1) along with the summary (see attachment 8) into revisions of MIL-PRF-39010E basic and slash sheets 1 thru 10 as appropriate.

V. RECOMMENDATIONS:

- a) Establish a project to revise MIL-PRF-39010E to take the following actions resulting from this EP study:
  - 1) Incorporating alternate mounting method for Temperature rise test proposed by API Delevan utilizing Keystone Electronics p/n 1268 terminal mounting clip (see attachment 3).
  - 2) Delete 4.8.10a while maintaining test condition C. this will remove any potential conflict in the procedures. See Results item 4 above
- b. Establish projects to revise MIL-PRF-39010 slash sheets 1 thru 10 to include ambient temperature to be used in performing the Temperature Rise test (see attachment 1 item 1).

## ATTACHMENT 6

### **Ebert, Eugene (Gene) A (DSCC)**

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**From:** Joe Browne [jbrowne@dniovan.com]  
**Sent:** Wednesday, August 20, 2003 4:37 PM  
**To:** eugene.ebert@dla.mil  
**Subject:** EP Study (MIL-PRF-39010)

Gene:

Initial evaluation is complete in regards to the use of v-notch terminals for the temperature rise test. A sample size of three pieces of P/N M39010/03A220KR was selected for the trial run (the fixture as shown in Figure 7 of MIL-PRF-39010E is tooled for three pieces). Parts were first mounted per the current method which is to wrap each lead one turn around the test fixture terminal and then solder the lead to the terminal. Test was performed. Temperature rise measurements recorded were 11.37°C, 10.27°C, and 10.40°C (Average: 10.68°C). Requirement is 15°C Max. After the test, the parts were then unsoldered, unwrapped, and removed from the terminals. The new V-notch clips were then mounted and soldered to the terminals. The same parts used in the first test were inserted into the clips and then soldered to the clips in the same order as the first test. The leads were NOT wrapped around the terminals or the clips. The leads were in their natural position prior to being soldered to the clips. Test was then performed. Temperature rise measurements recorded were 11.26°C, 11.22°C, and 10.33°C (Average: 10.94°C). Though there is no requirement for tolerance on repeatability, an engineering rule of thumb is that measurements recorded on the same part subjected to repeated tests should be within  $\pm 2$  degrees of each other. Consequently, the slight differences between readings would be considered normal.

It appears that measurements of parts soldered into the v-notch clips are as reliable as measurements made on parts that are wrapped and soldered to the fixture terminals. The clips are manufactured by Keystone Electronics Corp., Astoria, New York. Reference Keystone Part No. 1268. A data sheet is available for review.

If you have any questions or comments or are in need of further information, please feel free to contact me at your convenience. Thank you.